



CHAPTER 6

SITE PREPARATION AND REFORESTATION



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Site Preparation and Reforestation

General Definition and Purpose

Site preparation and reforestation refers to those methods used to prepare harvested areas for the establishment of desirable trees and to control undesirable vegetation.

The purpose of site preparation and reforestation work is to:

- Enhance forest establishment;
- Improve environmental protection of the woodlands; and
- Reduce the regeneration gap or the time to start a new forest.

Important concepts of site preparation are to:

- Enhance forest establishment;
- Occur only once in a forest rotation; and
- Ensure that the duration of risk of soil erosion lasts only until the site revegetates naturally, which is a short period of time in the forest life cycle.



General Conditions Where Practice Applies

These reforestation practices can be used where it is desirable to prepare areas for artificial or natural regeneration or to control undesirable vegetation.





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Although soil erosion may result from site preparation, it typically presents a much smaller erosion problem than construction projects or the annual cultivation of agricultural crops. As with other practices, the guiding principle is to expose as little soil as possible to accomplish the intended purposes. The land manager should carefully analyze site conditions and prescribe the treatment or treatments that will adequately remove competing vegetation with a minimum of site disturbance. Some site conditions that can influence treatment selection are:

Topography – Slope should be a major consideration in determining treatment intensity. Some treatments acceptable to the Piedmont and Coastal Plain Regions may be unsuited to the Mountains.

Soil – Inherent soil erodibility characteristics should be evaluated. Upland soils showing evidence of accelerated erosion from past field cropping should receive special attention to avoid removing all litter from the forest floor.

Residual Vegetation – The species, size, and amount of vegetation on the site will be a major determinant of treatment intensity. The greater the volume, the greater will be the need for intensive preparation with attendant risks of erosion. Every effort should be made to remove as much volume as possible through good utilization at the time of logging in order to avoid the need for extreme site preparation treatments.

Reforestation/Regeneration Plan

Purpose/Application

Pre-harvest planning often includes site preparation activities. If not, then a Regeneration Plan should be made prior to starting site preparation action. This plan should address the condition of the tract, adjacent property, and environmental concerns, including water quality. Potential problems should be identified and mitigating measures noted to prevent water quality problems. The plan could indicate, for example, that in some situations a light burn through the SMZ would do less damage than constructing a fireline adjacent to the SMZ. The land manager should carefully analyze site conditions and prescribe the treatment or treatments that will adequately remove competing vegetation and prepare the site for planting with a minimum of site disturbance.

General Specifications

1. Site preparation intensity will be confined to the minimum soil disturbance required to achieve the planned results.
2. Chemicals, fire and hand-logging—as opposed to the use of heavy machinery—will be favored on steep terrain and/or fragile soils.
3. Because it is less site disturbing, it is preferable to use a shear (KG) blade than to use a straight blade. Shearing and drum chopping are more preferable than disking. In general, disking should be avoided unless site conditions dictate no other management alternative.
4. An SMZ with undisturbed forest floor and ground cover of adequate width will be maintained adjacent to all intermittent and perennial streams. Soil disturbance along perennial and intermittent streams are subject to Virginia's Silvicultural Water Quality Law.
5. No debris or soil that might impede water flow or cause stream bank degradation will be placed in intermittent or perennial streams.

Individual Site Preparation Specifications

1. *Prescribed Burning* – Refer to Chapter 8, Fire Management, for specific BMPs for Prescribed Burning.
2. *Drum Chopping* – to knock down and crush residual trees, thereby providing available fuel for a prescribed burn. Limited mineral soil is exposed by drum chopping. On slopes in excess of 10% the direction of travel should be based on safe equipment operations.

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3. *Disking* – reduces unwanted vegetation by incorporating organic matter, reduces soil compaction, and improves the site for planting.

- A. Disk parallel to contour lines.
- B. Schedule operations during favorable soil moisture conditions. When soil moisture is favorable, a ball can be formed but will break apart readily when lightly squeezed between two fingers.
- C. Do not disk within SMZs or near streams.



4. *Bulldozing* – (straight, root rake and KG blade) to remove residual trees and pile debris.
 - A. If an erosion potential exists—and whenever possible—topsoil, including root mat, should be left in place to preserve site quality and minimize water quality impact. Stumps should be left in place. Keep dozer blade a minimum of 3 inches above ground surface. Do not expose more than 50% of the mineral soil.
 - B. Normally bulldozing must not be attempted on slopes greater than 45% due to operator safety, increased risk of erosion, inefficient equipment operation, and greater clearing cost.
 - C. Do not bulldoze the surface within SMZs or near streams.
 - D. Windrow Construction
 1. Windrows should be constructed along contour lines, as free of soil and as narrow as possible. Windrows are effective sediment traps.
 2. All standing vegetation should be pushed or sheared prior to windrow construction. Standing live trees should not be left in windrows.
 3. Slope, soil type and the amount of vegetation to be sheared or pushed will determine the distance between windrows. As the slope increases, the distance between windrows (slope length) should decrease. Reducing the slope length by spacing windrows as shown on Table 9 will reduce the potential for sheet and rill erosion.

4. For the purpose of forest wildfire access and wildlife passage, windrows should have openings of at least 20 feet in width for each 600 feet of length. Windrows, regardless of length, shall have a minimum opening of at least 20 feet between each end of the windrow and the boundary lines or SMZ of the tract being sheared or pushed. On steep terrain, openings within windrows must be offset in down-slope alignment to reduce the potential for water and sediment to move straight down hill and form gullies.

Table 9 Recommended Windrow Apacing	
Slope (percent)	Maximum Distance Between Windrows (feet)
10	200
20	150
30	100
40	60

5. Windrows can cross or occupy small gullies (less than 3 feet deep) where they will trap sediment. Larger gullies require surface water management to rehabilitate the eroded area.

E. Raking and Piling

1. Raking and piling in combination with shearing should be done very carefully when working on steep slope and fragile soil areas.
2. Toothed-type root rakes will be favored over straight and KG blades for raking and piling.
3. Care should be exercised in raking to avoid gouging and penetrating the soil with the blade.
4. When a sloping site is raked, the debris will be pushed into windrows placed on the contour to act as a trap or filter for any surface runoff. Where old gullies are present, debris (without soil attached) may be placed in the gullies to break the velocity of water flow during storm events.
5. The presence of considerable soil in the windrows is a sign of improper equipment operation when raking. Frequent checks are needed to prevent this from occurring.

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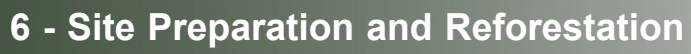
5. *Bedding* – to mound soil in rows to overcome poor soil conditions for seedling establishment.
 - A. Bedding should be on the contour if slope is discernible.
 - B. Bedding rows should not be “tied in” to any drainage. Avoid channeling runoff and sediment into streams and ditches.
6. *Furrowing, scalping and ripping* – to create a shallow furrow, removing sod competition (and sometimes sub-soiling to improve water infiltration and root penetration) to improve the site for tree planting and seedling survival.
 - A. Furrowing and scalping work should be done as shallow as possible and should be less than 6” deep.
 - B. The furrowing and scalping rows should follow the contours. Where the equipment cannot follow the contours, the plow or blade shall be picked up periodically to leave undisturbed strips to check erosion.
 - C. Sub-soiling or ripping of at least 12” in depth should follow contours.
 - D. Furrowing, scalping and sub-soiling rows should not channel water into any drainage.
7. *Hand Tools and Equipment* – the use of hand tools or other small equipment to destroy or reduce competing vegetation for the purpose of site preparation or timber stand improvement. Hand tools and equipment should be favored on steep slopes, fragile soils and in sensitive areas such as Streamside Management Zones.
8. *Machine Planting* – to establish tree seedlings and have the effect of sub-soiling to break up plow layers, hard pans or compacted soil.
 - A. Machine planting and sub-soiling should be done along contour lines. Steep slopes should be hand planted.
 - B. Site conditions must be suitable for machine planting operation.



9. *Pesticides / Herbicides* – Chemicals used in the forest consist almost entirely of herbicides used for the removal of unwanted vegetation and insecticides or fungicides used to control insects and diseases. Minor use is made of rodenticides and animal repellents for specialized purposes. For further information see Chapter 7, Silvicultural Chemical Treatment.

Precautions

- *Avoid excessive soil compaction.*
- *Soil disturbance should be kept to a practical minimum.*
- *Minimize disturbance on slopes with extremely erodible soils.*
- *Wherever possible, mechanical site preparation should follow the contour.*
- *Wherever possible, discharge water from site-prepared areas onto vegetated surfaces.*
- *Operations should be planned to minimize disturbance in filter strips.*
- *No chemical containers or equipment should be washed in any stream.*

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